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Reply to Office Action of August 2, 2005

Amendments to the Specification:

Please amend paragraphs [01], [02], [03], [04], [05], [06], [031] and [073] of the specification as follows:

[01] In commonly owned United States Patent Applications: (1) United States Patent No. 6,903,754 ("the '754 Patent") [United States Patent Application Serial No. 09/916,232] (~~the '232 application~~), entitled "ARRANGEMENT OF COLOR PIXELS FOR FULL COLOR IMAGING DEVICES WITH SIMPLIFIED ADDRESSING," filed July 25, 2001; (2) United States Publication No. 2003/0128225 ("the '225 application") [United States Patent Application Serial No. 10/278,353] (~~the '353 application~~), entitled "IMPROVEMENTS TO COLOR FLAT PANEL DISPLAY SUB-PIXEL ARRANGEMENTS AND LAYOUTS FOR SUB-PIXEL RENDERING WITH INCREASED MODULATION TRANSFER FUNCTION RESPONSE," filed October 22, 2002; (3) United States Publication No. 2003/0128179 ("the '179 application") [United States Patent Application Serial No. 10/278,352] (~~the '352 application~~), entitled "IMPROVEMENTS TO COLOR FLAT PANEL DISPLAY SUB-PIXEL ARRANGEMENTS AND LAYOUTS FOR SUB-PIXEL RENDERING WITH SPLIT BLUE SUB-PIXELS," filed October 22, 2002; (4) United States Publication No. 2004/0051724 ("the '724 application") [United States Patent Application Serial No. 10/243,094] (~~the '094 application~~), entitled "IMPROVED FOUR COLOR ARRANGEMENTS AND EMITTERS FOR SUB-PIXEL RENDERING," filed September 13, 2002; (5) United States Publication No. 2003/0117423 ("the '423 application") [United States Patent Application Serial No. 10/278,328] (~~the '328 application~~), entitled "IMPROVEMENTS TO

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COLOR FLAT PANEL DISPLAY SUB-PIXEL ARRANGEMENTS AND LAYOUTS WITH REDUCED BLUE LUMINANCE WELL VISIBILITY," filed October 22, 2002; (6) United States Publication No. 2003/0090581 ("the '581 application") [United States Patent Application Serial No. 10/278,393] (~~"the '393 application"~~), entitled "COLOR DISPLAY HAVING HORIZONTAL SUB-PIXEL ARRANGEMENTS AND LAYOUTS," filed October 22, 2002; (7) United States Publication No. 2004/0080479 ("the '479 application") [United States Patent Application Serial No. 010/347,001] (~~"the '001 application"~~) entitled "IMPROVED SUB-PIXEL ARRANGEMENTS FOR STRIPED DISPLAYS AND METHODS AND SYSTEMS FOR SUB-PIXEL RENDERING SAME," filed January 16, 2003, each of which is herein incorporated by reference in its entirety, novel sub-pixel arrangements are disclosed for improving the cost/performance curves for image display devices.

[02] For certain subpixel repeating groups having an even number of subpixels in a horizontal direction, the following systems and techniques to affect improvements, e.g. proper dot inversion schemes and other improvements, are disclosed and are herein incorporated by reference in their entirety: (1) United States Publication No. 2004/0246280 ("the '280 application") [United States Patent Application Serial Number 10/456,839] entitled "IMAGE DEGRADATION CORRECTION IN NOVEL LIQUID CRYSTAL DISPLAYS" filed June 6, 2003; (2) United States Publication No. 2004/0246213 ("the '213 application") [United States Patent Application Serial No. 10/455,925] entitled "DISPLAY PANEL HAVING CROSSOVER CONNECTIONS EFFECTING DOT INVERSION" filed June 6, 2003; (3) United States Publication No.

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2004/0246381 ("the '381 application") [United States Patent Application Serial No. 10/455,931] entitled "SYSTEM AND METHOD OF PERFORMING DOT INVERSION WITH STANDARD DRIVERS AND BACKPLANE ON NOVEL DISPLAY PANEL LAYOUTS" filed June 6, 2003; (4) United States Publication No. 2004/0246278 ("the '278 application") [United States Patent Application Serial No. 10/455,927] entitled "SYSTEM AND METHOD FOR COMPENSATING FOR VISUAL EFFECTS UPON PANELS HAVING FIXED PATTERN NOISE WITH REDUCED QUANTIZATION ERROR" filed June 6, 2003; (5) United States Publication No. 2004/0246279 ("the '279 application") [United States Patent Application Serial No. 10/456,806] entitled "DOT INVERSION ON NOVEL DISPLAY PANEL LAYOUTS WITH EXTRA DRIVERS" filed June 6, 2003; (6) United States Publication No. 2004/0246404 ("the '404 application") [United States Patent Application Serial No. 10/456,838] entitled "LIQUID CRYSTAL DISPLAY BACKPLANE LAYOUTS AND ADDRESSING FOR NON-STANDARD SUBPIXEL ARRANGEMENTS" filed June 6, 2003; (7) United States Publication No. 2005/0083277 ("the '277 application") [United States Patent Application Serial No. 10/696,236] entitled "IMAGE DEGRADATION CORRECTION IN NOVEL LIQUID CRYSTAL DISPLAYS WITH SPLIT BLUE SUBPIXELS", filed October 28, 2003; and (8) United States Publication No. 2005/0212741 ("the '741 application") [United States Patent Application Serial No. 10/807,604] entitled "IMPROVED TRANSISTOR BACKPLANES FOR LIQUID CRYSTAL DISPLAYS COMPRISING DIFFERENT SIZED SUBPIXELS", filed March 23, 2004.

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[03] These improvements are particularly pronounced when coupled with sub-pixel rendering (SPR) systems and methods further disclosed in those applications and in commonly owned United States Patent Applications: (1) United States Publication No. 2003/0034992 ("the '992 application") [United States Patent Application Serial No. 10/051,612] (~~the '612 application~~), entitled "CONVERSION OF RGB A SUB-PIXEL FORMAT DATA TO PENTILE MATRIX ANOTHER SUB-PIXEL DATA FORMAT," filed January 16, 2002; (2) United States Publication No. 2003/0103058 ("the '058 application") [United States Patent Application Serial No. 10/150,355] (~~the '355 application~~), entitled "METHODS AND SYSTEMS FOR SUB-PIXEL RENDERING WITH GAMMA ADJUSTMENT," filed May 17, 2002; (3) United States Publication No. 2003/0085906 ("the '906 application") [United States Patent Application Serial No. 10/215,843] (~~the '843 applicatten~~), entitled "METHODS AND SYSTEMS FOR SUB-PIXEL RENDERING WITH ADAPTIVE FILTERING," filed August 8, 2002; (4) United States Publication No. 2004/0196302 ("the '302 application") [United States Patent Application Serial No. 10/379,767] entitled "SYSTEMS AND METHODS FOR TEMPORAL SUB-PIXEL RENDERING OF IMAGE DATA" filed March 4, 2003; (5) United States Publication No. 2004/0174380 ("the '380 application") [United States Patent Application Serial No. 10/379,765] entitled "SYSTEMS AND METHODS FOR MOTION ADAPTIVE FILTERING," filed March 4, 2003; (6) United States Patent No. 6,917,368 ("the '368 patent") [United States Patent Application Serial No. 10/379,766] entitled "SUB-PIXEL RENDERING SYSTEM AND METHOD FOR IMPROVED DISPLAY VIEWING ANGLES" filed March 4, 2003; (7) United States Publication No. 2004/0196297 ("the '297 application") [United States Patent Application Serial No.

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10/409,413 1 entitled "IMAGE DATA SET WITH EMBEDDED PRE-SUBPIXEL RENDERED IMAGE" filed April 7, 2003, which are hereby incorporated herein by reference in their entirety.

[04] Improvements in gamut conversion and mapping are disclosed in commonly owned and co-pending United States Patent Applications: (1) United States Patent No. 6,980,219 ("the '219 patent") [United States Patent Application Serial No. 10/691,200 1 entitled "HUE ANGLE CALCULATION SYSTEM AND METHODS", filed October 21, 2003; (2) United States Publication No. 2005/0083341 ("the '341 application") [United States Patent Application Serial No. 10/691,377 1 entitled "METHOD AND APPARATUS FOR CONVERTING FROM SOURCE COLOR SPACE TO RGBW TARGET COLOR SPACE", filed October 21, 2003; (3) United States Publication No. 2005/0083352 ("the '352 application") [United States Patent Application Serial No. 10/691,396 1 entitled "METHOD AND APPARATUS FOR CONVERTING FROM A SOURCE COLOR SPACE TO A TARGET COLOR SPACE", filed October 21, 2003; and (4) United States Publication No. 2005/0083344 ("the '344 application") [United States Patent Application Serial No. 10/690,716 1 entitled "GAMUT CONVERSION SYSTEM AND METHODS" filed October 21, 2003 which are all hereby incorporated herein by reference in their entirety.

[05] Additional advantages have been described in (1) United States Publication No. 2005/0099540 ("the '540 application") [United States Patent Application Serial No. 10/696,235 1 entitled "DISPLAY SYSTEM HAVING IMPROVED MULTIPLE

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MODES FOR DISPLAYING IMAGE DATA FROM MULTIPLE INPUT SOURCE FORMATS", filed October 28, 2003 and (2) United States Publication No. 2005/0088385 ("the '385 application") [United States Patent Application Serial No. 10/696,026] entitled "SYSTEM AND METHOD FOR PERFORMING IMAGE RECONSTRUCTION AND SUBPIXEL RENDERING TO EFFECT SCALING FOR MULTI-MODE DISPLAY" filed October 28, 2003.

[06] Additionally, these co-owned and co-pending applications are herein incorporated by reference in their entirety: (1) United States Publication No. 2005/0225548 ("the '548 application") [United States Patent Application Serial No. 10/821,387] [~~ATTORNEY DOCKET NUMBER 08831.0064~~] entitled "SYSTEM AND METHOD FOR IMPROVING SUB-PIXEL RENDERING OF IMAGE DATA IN NON-STRIPED DISPLAY SYSTEMS" filed April 9, 2004; (2) United States Publication No. 2005/0225561 ("the '561 application") [United States Patent Application Serial No. 10/821,386] [~~ATTORNEY DOCKET NUMBER 08831.0065~~] entitled "SYSTEMS AND METHODS FOR SELECTING A WHITE POINT FOR IMAGE DISPLAYS" filed April 9, 2004; (3) United States Publication No. 2005/0225574 ("the '574 application") [United States Patent Application Serial No. 10/821,353] [~~ATTORNEY DOCKET NUMBER 08831.0066~~] entitled "NOVEL SUBPIXEL LAYOUTS AND ARRANGEMENTS FOR HIGH BRIGHTNESS DISPLAYS" filed April 9, 2004 (4) United States Publication No. 2005/0225562 ("the '562 application") [United States Patent Application Serial No. 10/821,306] [~~ATTORNEY DOCKET NUMBER 08831.0067~~] entitled "SYSTEMS AND METHODS FOR IMPROVED GAMUT MAPPING FROM ONE IMAGE DATA SET TO

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ANOTHER" filed April 9, 2004; which are all hereby incorporated by reference. All patent applications mentioned in this specification are hereby incorporated by reference in their entirety.

[031] In many cases, novel RGBW panels (and 5-, 6-, n- color panels, for that matter) will be called upon to render legacy RGB or other 3-color image data. In many applications incorporated by reference above, there are described various embodiments for subpixel rendering resampling a modified conventional image data set. The modification is that each and every incoming conventional pixel has four (or more) -- instead of three -- color component values; e.g. Red, Green, Blue, and "White". The "White" in quotes denotes that this color point may or may not be at the white point of the display when all color subpixels are set to their maximum values. It may be desirable that any Gamut Mapping Algorithm (GMA) conversion from RGB to RGBW (or other multiprimary color space) occur before the subpixel rendering to keep the image from being blurred. The filter set could be designed to produce good results for both text and photographs. For example, in the '094 724 application incorporated by reference, there is shown some novel RGBW and RGBC layouts. For these layouts, one embodiment of the filters for the SPR for layouts that have a red/green checkerboard such as shown in:

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Red and Green use:

$$\begin{array}{ccccccc}
 -.0625 & 0 & -.0625 & & 0 & .125 & 0 \\
 0 & .25 & 0 & + & .125 & .5 & .125 \\
 -.0625 & 0 & -.0625 & & 0 & .125 & 0
 \end{array}
 =
 \begin{array}{ccc}
 -.0625 & .125 & -.0625 \\
 .125 & .75 & .125 \\
 -.0625 & .125 & -.0625
 \end{array}$$

DOG Wavelet + Area Resample = Cross-Color Sharpening Kernel

[073] Using a point near the exact center of the sub-pixel as the resample point, in some cases, may be simplified by changing the edge assumptions. A simplifying assumption of placing a target layout (such as shown in the '353 '225 application and other applications incorporated herein) on top of 4 source pixels may result in diamonds and boxes that may be out-of-phase with the input pixels. One example is seen in Figures 13A, 13B, and 13C – depicting the red, green and blue resample areas respectively. Translating all the resample points together is not a simplification since the choice of edge alignment could be arbitrary. In many of the layouts, a slight shift to the left of all the resample points resulted in much simpler filters and sharper greens. For example, such suitable shifts result in the resampling areas seen in Figures 14A, 14B, and 14C.